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ABSTRACT

In order to determine if major differences exist in 1980 in medical technology programs, a nationwide survey was conducted to review course requirements of medical technology programs. A letter written on the American Society for Medical Technology stationery was mailed to 634 medical technology programs requesting a brochure or college catalog. The brochures and catalogs that were received were examined for the following information: type of program, approval of program by the National Accrediting Agency for Clinical Laboratory Sciences and the Committee on Allied Health Education and Accreditation of the American Medical Association, prerequisite listings, fees and expenses, number of credits received for the senior year of study, and type of degree awarded. The highest frequency of responses (73 percent) was from the traditional (three plus one) hospital-based programs. The responses from the survey indicated that 51 percent of the medical technology programs are approved/accredited. Four prerequisite listings were significant (quantitative analysis, organic chemistry, physiology, and physics), indicating that the three-plus-one university-based programs tend to require these four courses more often than the three-plus-one hospital-based programs. (Author/SW)

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STATUS OF REQUIREMENTS FOR MEDICAL TECHNOLOGY CURRICULA

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ABSTRACT

For this study, a letter written on the American Society for Medical Technology stationary was mailed nationwide to 634 medical technology programs requesting a brochure or college catalogue. The brochures and catalogues received from these medical technology programs were perused for the following information: type of program, approval of program by NAACLS (CAHEA), prerequisite listings, fees and expenses, number of credits received for the senior year of study and type of degree awarded.

The highest frequency of responses (73%) was from the traditional 3 + 1 hospital-based programs. The responses from the survey indicated that 51% of the medical technology programs are approved/accredited by NAACLS (CAHEA). The results of the chi-square test were highly significant for four prerequisite listings (quantitative analysis, organic chemistry, physiology, and physics), indicating that 3 + 1 university-based programs tend to require these four courses more often than 3 + 1 hospital-based programs.

STATUS OF REQUIREMENTS FOR MEDICAL TECHNOLOGY CURRICULA

Introduction

Curriculum content selection is particularly important in the clinical laboratory sciences because of rapidly expanding technological advances. Given the informational explosion and time constraints, careful consideration has to be given to prerequisite courses in medical technology curriculum. Consequently, a major study was needed to:

a) determine the present status of prerequisite courses for medical technology education nationwide, and

b) develop a consensus for medical technology prerequisite courses to assure accountability to the public for quality preparation of the student.

The "Essentials of an Accredited Educational Program for the Medical Technologist" as adopted by the National Accrediting Agency for Clinical Laboratory Sciences (NAACLS) and the Committee on Allied Health Education and Accreditation of the American Medical Association (CAHEA)defines the minimum chemistry, biological science, and mathematics prerequisites that must be included within the total medical technology curriculum.[2] Accreditation of a medical technology program by NAACLS requires adherence to these prerequisite listings. Those academic prerequisites that a program requires beyond the minimal requirements of NAACLS may vary depending upon the nature of the program. Thus, it should be expected that a wide variation exists in course requirements between medical technology programs since it is the prerogative of the program and its affiliated institution of higher education to decide upon curricular content beyond the minimal prerequisites.

In order to determine if major differences exist in 1980 in medical technology programs, a nationwide survey was conducted to review course requirements of medical

technology programs. The approach of this study was similar to the survey performed by Rausch and Karni in 1970 in that information was reviewed as supplied in college catalogues and medical technology brochures from the viewpoint of a student who is considering medical technology as his/her declared major in college.[3]

Methodology

For this survey, a letter written on the American Society for Medical Technology (ASMT) stationary was mailed nationwide to 634 medical technology programs requesting a brochure or college catalogue. The addresses for these programs were obtained from the Education for Allied Health Careers.[1] Responses from the mailing were collected in a two and one-half month period that began in November, 1979. A total of 367 (58%) catalogues and/or brochures were received within this period, a percentage which was higher than anticipated.

The brochures/catalogues received from these medical technology programs were perused for the following information:

a) type of program
   1) 3+1 (4+1) hospital-based: three or four years of academic preparation and one year of hospital experience;
   2) 2+2: two years of general academic preparation and two years in a medical technology curriculum;
   3) 3+1 (4+1) university-based: three or four years of collegiate study and one year in a university based medical technology curriculum;
   4) integrated: medical technology curriculum that is dispersed throughout a four year baccalaureate degree program; and
   5) post-baccalaureate: program accepts applicants only with baccalaureate degree.

b) approval of program by NAACLS (CAHEA)

c) prerequisite listings

d) fees and expenses

e) number of semester/quarter credits received for the senior year of study

f) type of degree awarded

For the data that were collected by reviewing these brochures/catalogues, cross-classification tables were produced. The types of programs were cross-tabulated with the prerequisite listings, fees and expenses, number of semester/quarter credits received for the senior year of study, and type of degree awarded.

Contingency tables were derived on the types of programs and prerequisite listings. The frequencies of hospital-based and university-based programs were cross-tabulated with the prerequisite listings and then chi-squares (χ^2) were computed to determine whether the frequencies obtained in the cells of the table were different from the frequencies that might be expected on chance variation alone.

Results and Discussion

One of the main objectives of the study was to determine the various types of medical technology programs in the nation. Presented in Table I are the frequency of responses from different types of programs. The highest frequency of responses (73%) was from the traditional 3+1 hospital-based programs. The remaining 27% of the responses were obtained from 2+2, post-baccalaureate, discontinued, 3+1 university-based and four-year integrated programs. One of the 3+1 university-based programs offered evening classes and one integrated program offered classes for part-time students. These two programs were the only two non-traditional medical technology programs identified through the perusal of the received catalogues/brochures.

Table II shows data concerning programmatic approval by NAACLS (CAHEA). The responses indicated that 51% of the medical technology programs are approved/accredited by NAACLS (CAHEA) whereas 26% of the programs had brochures/catalogues

that stated they were approved/accredited by the Board of Schools. Since it has been seven years from the time the Board of Schools had mutated into the National Accrediting Agency for Clinical Laboratory Sciences to the time of this study, it can only reflect a lack of understanding or initiative on the part of these medical technology programs that state approval by the "Board of Schools" to revise and update their programmatic information.

Presented in Table III are the semester hours that the brochures/catalogues stated that are required in chemistry and biology before entry into 3 + 1 and 4 + 1 hospital-based and university-based medical technology programs and 2 + 2 medical technology programs. Since the integrated programs include medical technology courses in the freshman year of collegiate study, these programs were not included in this table. Thus, substracting the responses from the 14 integrated programs and four discontinued programs, the total number of responses for Table III is 349 programs.

Accreditation by NAACLS requires adherence to the minimal requirements of 16 semester hours in chemistry and 16 semester hours in biology for 3 + 1 (4+1) hospital-based or university-based medical technology programs. As the data indicate, a brochure from one hospital-based 3 + 1 program stated that it required less than 16 semester hours of chemistry and 16 semester hours of biology. It is not surprising to see that 2 + 2 medical technology programs require less than 16 semester hours of chemistry and 16 semester hours of biology since they incorporate additional chemistry and biology courses in the 2 + 2 curriculum.

It is interesting to note that 34 of the brochures/catalogues did not provide information on the number of semester hours of chemistry prerequisites that are needed for entry into their programs and 39 of the brochures/catalogues did not state the number of semester hours in biology that are required for entry into their curricula. It seems that this type of information is invaluable to a student pursuing medical technology as a profession.

Table IV provides data concerning fees and expenses for medical technology programs. For 22% of the responses from the 363 ongoing programs, registration is required upon acceptance into their medical technology programs. Tuition is required for 36% of these programs. Considering that NAACLS specifically discourages stipends since "they tend to imply that service is rendered" (p. 12), it was surprising to find that 61 hospital-based programs still offer a stipend to their students.[2]

In "A Tilt at a Windmill? - A Study of Medical Technology Education" by Rausch and Karni, they reviewed medical technology brochures/catalogues for the description of the courses in the medical technology curriculum.[3] They found that the majority of college bulletins did not contain information on the specific courses and unit of credit in a medical technology program. As a comparison, this study reviewed the brochures/catalogues for the same type of information. As shown in Table V, 31% of the responses had the subject areas for the curriculum listed without credits or course numbers. For 24% of the responses, the brochures/catalogues listed the subject areas to be studied in the program by weeks of rotation only. Thus, for 55% of the bulletins, information was lacking on number of credits received for courses taken in the curriculum. This lack of information can be deterimental to a student who graduates from one of these programs. If the student wishes to pursue a graduate degree, then he/she has no documentation of the content and level of courses that were taken in his/her senior year in the medical technology program.

The brochures/catalogues were also purused for the type of degree awarded upon completion of the medical technology curriculum. As indicated in Table VI, 45% of the programs state that the student will receive a Bachelor of Science degree upon completion of the program. For 31% of the programs, it was optional to receive a Bachelor of Science or Bachelor of Arts degree. It was interesting to see that 9 of the programs offered a Bachelor of Health Sciences or Bachelor of

Allied Health Sciences upon completion of th program.

Looking specifically at the frequencies of prerequisite listings for hospital-based and university-based programs, chi-squ res (χ^2) were computed to determine whether the frequencies were different from he frequencies that might be expected on chance variation alone. As shown in Tabl VII, the results of the chi-square test were highly significant for four prereq isite listings indicating that 3+1 (4+1) university-based programs tend to requ re the following courses more often than 3+1 (4+1) hospital-based programs: phys iology, quantitative analysis (analytical chemistry), physics, and greater tha n four hours of organic chemistry. Thus, the null hypothesis that prerequisite l istings do not differ for 3+1 (4+1) hospital-based and university-based programs can be rejected at this high level of significance (see Table VII) for these fou r prerequisites.

Conclusion s

This survey which was conducted by purus ing brochures/catalogues from medical technology programs nationwide confirms that a lack of consensus exists for: a) medical technology prerequisites, b) oth er programmatic requirements such as credit assignment for clinical courses during the senior year in a program, and c) the organization that accredits medical t echnology programs - NAACLS or Board of Schools?

A shortcoming of the findings is that 55 of the brochures/catalogues lacked information on number of credits received for courses taken in the senior year of the medical technology programs. Thus, a stu dent who graduates from one of these programs and wishes to pursue a graduate degr e has no documentation of the content and level of courses that were taken in his/he senior year of college.

As the brochures were reviewed for vario s information, it became apparent that many of these bulletins did not contain disclaimer such as "the provisions of this bulletin are subject to change withou notice and do not constitute an irrevocable contact between any applicant fo admission or student and the hospital (university). The hospital (university) is n t responsible for any misrepresentation

of its requirements or provisions that might arise as a result of errors in the preparation of this bulletin".

If a program publishes a brochure and no catalogue, this brochure is analogous to a catalogue in that it serves as the program's contract with the student. Thus, if the program does not want to be bound to all provisions in its brochure (i.e. outdated or errors in the bulletin), it is wise to include a disclaimer. A disclaimer printed in the brochure is a small price to pay to avoid a law suit.

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References:

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2. National Accrediting Agency for Clinical Laboratory Sciences. Essentials of an Accredited Educational Program for the Medical Technologist. Chicago, Ill: NAACLS, 1977.
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TABLE I

TYPES OF PROGRAMS

2 + 2 Program Only	26 (7%)
Post-Baccalaureate Program Only	24 (7%)
Discontinued Program	4 (1%)
3 + 1 Hospital-Based	253 (73%)
3 + 1 University-Based	28 (8%)
4 Year Integrated Program	14 (4%)

TABLE II

APPROVAL OF PROGRAM BY NAACLS (CAHEA)	177 (51%)
APPROVAL OF PROGRAM BY THE BOARD OF SCHOOLS OF THE ASCP OR THE REGISTRY OF MEDICAL TECHNOLOGISTS OF THE ASCP	89 (26%)

TABLE III

NUMBER OF SEMESTER HOUR CREDITS REQUIRED BEFORE

ENTRY INTO MEDICAL TECHNOLOGY CURRICULUM

# of S.H. Credit	# of Institutions Requiring Indicated Credits in Chemistry			# of Institutions Requiring Indicated Credits in Biology		
	4+1 (3+1)	2+2	Total	4+1 (3+1)	2+2	Total
7-15	1	7	8 (2.4%)	1	16	17 (5%)
16	264	16	280 (80%)	259	10	269 (77%)
17	2	--	2 (.6%)	--	--	--
18	2	2	4 (1.2%)	5	1	6 (1.7%)
19	1	1	2 (.6%)	2	--	2 (.6%)
20	6	5	11 (3.0%)	3	2	5 (1.3%)
21	1	--	1 (.3%)	3	--	3 (.8%)
22	1	--	1 (.3%)	--	--	--
23	2	--	2 (.6%)	--	--	--
24	2	--	2 (.6%)	2	--	2 (.6%)
25	--	--	--	1	2	3 (.8%)
27	2	--	2 (.6%)	1	--	1 (.3%)
28				1	--	1 (.3%)
29-34				1	--	1 (.3%)
No Information	34		34 (9.8%)	39		39 (11.3%)

% of 349 Programs

TABLE IV

FEES AND EXPENSES

	4+1 or 3+1	2+2	Integrated	Total
Registration	69 (20%)	6 (2%)	1 (.2%)	76 (22%)*
Tuition	103 (30%)	19 (5%)	5 (1%)	127 (36%)*
Stipends	61 (18%)			61 (18%)*

*% of 363 Programs

TABLE V

CREDIT ASSIGNMENT FOR CLINICAL COURSES DURING THE SENIOR YEAR IN MEDICAL TECHNOLOGY PROGRAMS

	4 + 1	3 + 1	2 + 2	Integrated	Total
Courses listed with course numbers and credits by subject area	32 (9%)	25 (7%)	9 (2%)	66 (18%)	
Subject area listed with credit but not course number	35 (10%)			35 (10%)	
Subject area listed without credits or course numbers	108 (31%)	2 (.5%)		110 (31%)	
Courses listed with course numbers but no credits	5 (1%)		1 (.2%)	6 (1%)	
Subject area listed by weeks of rotation but no credits	89 (24%)			89 (24%)	
No listings	39 (11%)			39 (11%)	
Correspondence by letter				22 (6%)	
Total				367 (100%)	

TABLE VI

TYPE OF DEGREE AWARDED

	4+1 3+1	2+2	Integrated	Total
B.S.	130 (38%)	18 (5%)	7 (2%)	155 (45%)
B.A.	2 (.5%)			2 (.5%)
Optional B.S. or B.A.	103 (30%)	1 (.2%)	1 (.2%)	105 (31%)
Other	8 (2%)	1 (.2%)		9 (2%)
No Information Given in Brochure or Catalog	72 (21%)		2 (.5%)	74 (21.5%)

TABLE VII

PREREQUISITE LISTINGS FOR 3+1(4+1)
UNIVERSITY AND HOSPITAL-BASED PROGRAMS

	Hospital	University
Organic Chemistry <4 sem hrs	224	13
Organic Chemistry >4 sem hrs	13	15

$\chi^2 = 59.37$
df = 1
$p<.001$

Immunology	Hospital	University
Required	214	20
Not Required	39	8

$\chi^2 = 2.26$
df = 1
$p>.05$

Physiology	Hospital	University
Required	20	14
Not Required	233	14

$\chi^2 = 46.05$
df = 1
$p<.001$

Quantitative Analysis	Hospital	University
Required	48	20
Not Required	205	8

$\chi^2 = 40.73$
df = 1
$p<.001$

Physics	Hospital	University
Required	42	13
Not Required	211	15

$\chi^2 = 16.2$
df = 1
$p<.001$